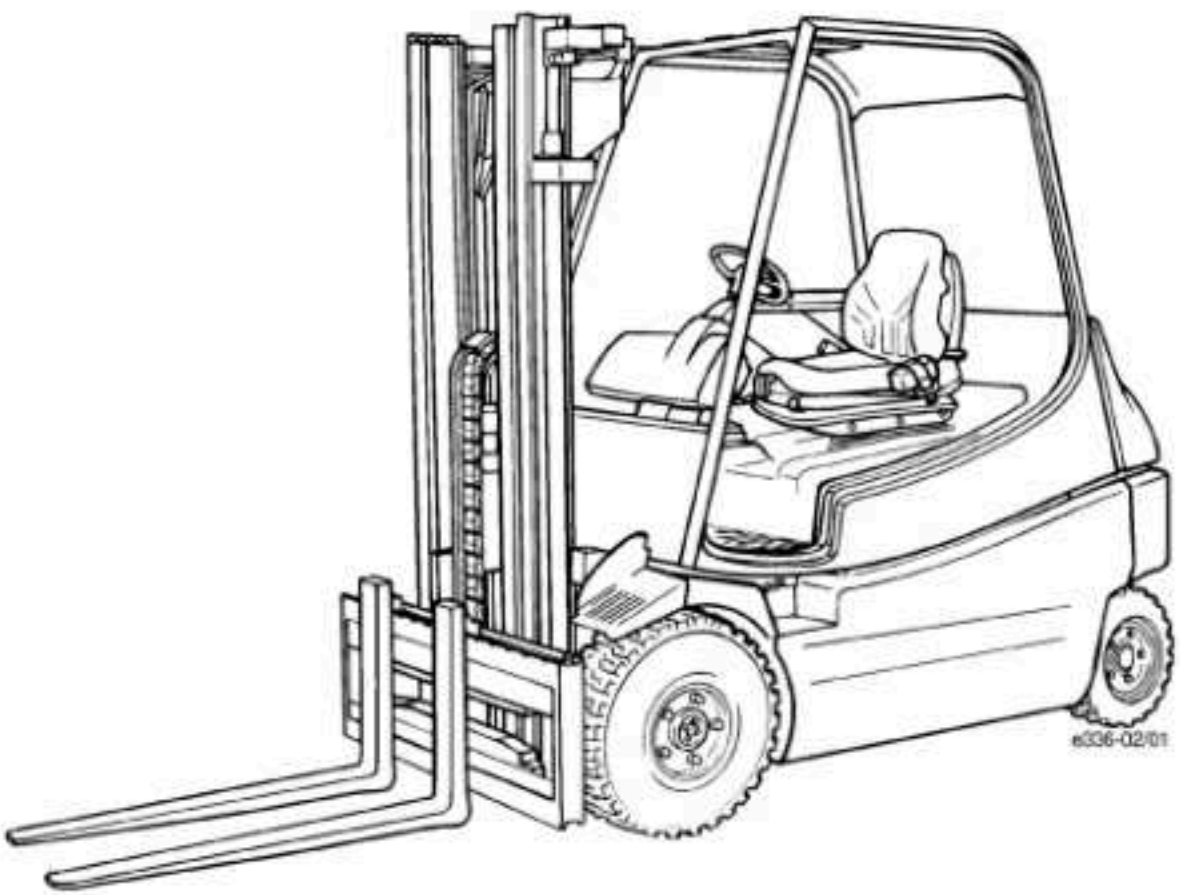
Service Training

Electric Lift Truck E 25/30 S with AC motors Series 336 -03



This training material is only provided for your use and remains the exclusive property of
LINDE AG Linde Material Handling Division

MidWestTech | Linde E 25, E30 S with AC motors Series 336 -03 Electric Forklift Service Ma... Order the manual at mid-west-tech.com >

Charging of the capacitors in the intermediate circuits

The capacitors in the intermediate circuits of the power units need to be charged before the main contactor is switched on. This is to prevent arc formation on closing of the contact of the main contactor, which will cause contact burn-out. As soon as the key-operated switch S1 is switched on, the charging relay K2 is energised through X13:64. At the same time, the discharging relay K3 is activated, as this relay is directly supplied by the 24 V voltage transformer. The intermediate-circuit capacitors are now charged through fuses (2F1, F7), relay contact (K2), charging resistors (1R1, 2R1), and the fuses (1F8, 2F6) .

The capactitor voltage is fed back to the controller through X13:23 and X13:42. Upon completion of the charging process, relay K2 is de-energised, the main contactor is activated on the negative side through X13:1.

Discharging of the capacitors in the intermediate circuits

As soon as the key-operated switch S1 is switched to off, relay K3 is de-energised. The capacitors in the intermediate circuit can now discharge towards the battery negative connection through fuses (1F8, 2F6), charging resistors (1R1, 2R1), relay contact K2, discharging resistor R2 and relay contact R3.

Resistances in the charging circuit

07.02

1R1 19.5 Ω 2R1 39 Ω R2 2 kΩ

Enable signal

The functions Traction and Working Hydraulics are only activated if X13:33 is connected to battery negative. This negative signal is controlled by the cabin switch S4 and the seat switch S3.

Power supply to truck speed controller and steering sensor

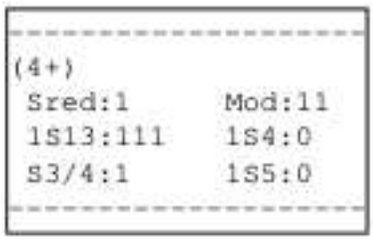
A power supply of 14.3 V to the truck speed controller 1A4 and the steering sensor 3B1 is supplied through X13:60. The negative supply is connected through X13:70.

Truck speed controller

The truck speed controller is located on the pedal unit. A 14.3 V power supply is provided by the controller. The output signal of the truck speed controller controls the speed and torque of both traction motors. For safety reasons, the truck speed controller is equipped with two potentiometers working in opposite directions. The two potentiometer signals are connected to the controller through X13:19 and X13:20.

MidWestTech | Linde E 25, E30 S with AC motors Series 336 -03 Electric Forklift Servic... Order the manual at mid-west-tech.com >

WINDOW 4 - SWITCHING INPUTS



Window 4 shows the circuit state of the digital inputs. The designations of the signals are identical to those used in the circuit diagram.

Sred: Circuit state of the input for switch-reduced speed reduction

1: Speed reduction not activated (negative signal applied to X1:73)
0: Speed reduction activated (negative signal not applied to X1:73)

Mod: Fault feedback from power units

Mod: XX (first digit represents power module 1A2, second digit, power module 1A1)

1: Power module signals no fault
0: Power module signals fault

1S13: Circuit status of direction switch

111 2-pedal truck
010 1-pedal truck, direction switch in neutral position
100 1-pdeal truck, forward direction selected
001 1-pedal truck, reverse direction selected

1S4: Signal from hand brake switch

0: Hand brake applied
1: Hand brake not applied

S3/4: Signal from seat switch and cabin switch

0: No driver on seat and/or cabin switch open
1: Driver on seat and cabin closed

1S5: Signal from stop pedal switch

0: Stop pedal actuated
1: Stop pedal not actuated

MidWestTech | Linde E 25, E30 S with AC motors Series 336 -03 Electric Forklift Servic... Order the manual at mid-west-tech.com >

Nr.	Fault description/Comment	Fault condition	Possible causes
79	Safety monitoring of clock signals for cut-out capability. *Consequence: Working hydraulics deactivated.*	Controller-internal condition.	Internal fault in the controller.
80	Safety processor is unable to switch off safety valve during self test. *Consequence: Working hydraulics deactivated.*	Controller-internal condition.	Internal fault in the controller.
81	Safety processor is unable to switch off safety relay during self test. *Consequence: Working hydraulics deactivated. Steering function remains available.*	Controller-internal condition.	Fault in pathX13:118 - ... (Connection to L+), or internal fault in the controller.
82	Safety processor is unable to switch off safety lowering valve during self test. *Consequence: Working hydraulics deactivated.*	Controller-internal condition.	Internal fault in the controller.

MidWestTech | Linde E 25, E30 S with AC motors Series 336 -03 Electric Forklift Service Manual | Publication 36-804-2410

Order the manual at mid-west-tech.com >

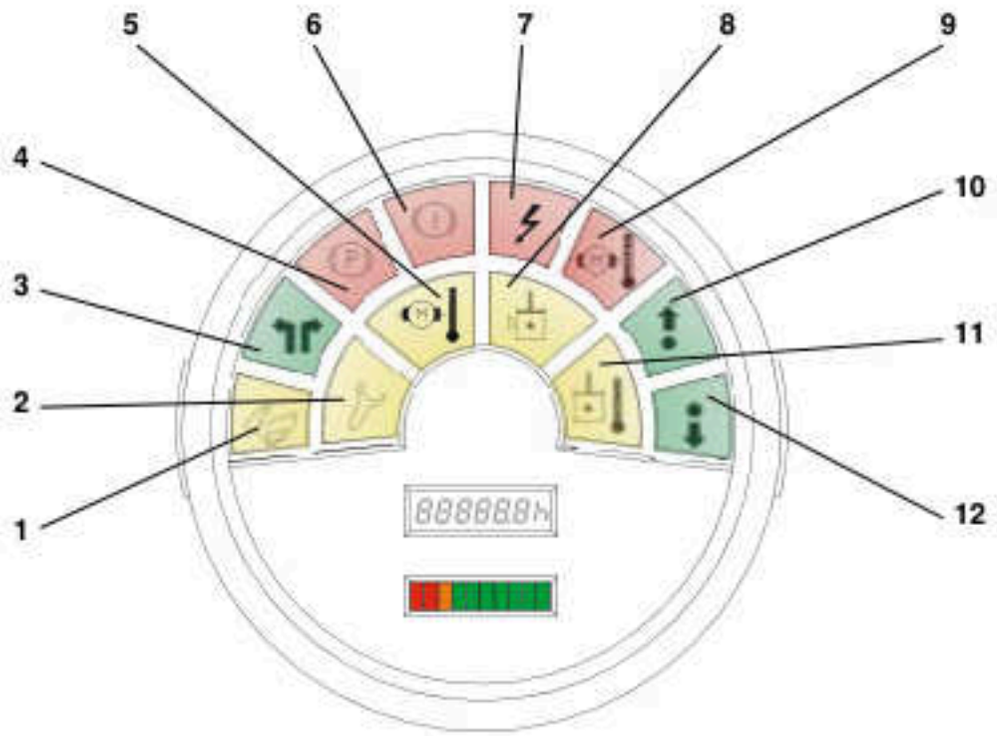
Service Training

COMBINATION INSTRUMENT

The combination instrument integrates the battery discharge indicator, the operating hour meter, and a number of signal lamps. All functions provided by the combination instrument are controlled by a 4-bit microcontroller. This microcontroller is equipped with an internal ROM (read-only memory), which contains the operating software. The software version is shown on a label on the side of the combination instrument. After turning on the key operated switch, the software version is shown on the display after the self-test.

In addition, the instrument integrates a RAM (main memory) and an EEPROM, containing truck-specific information (battery characteristics, operating hours and other data). The combination instrument can be programmed and its contents read-out through the diagnostic connector 6X1. In addition, the instrument has two relays, which serve to control the fans.

SIGNAL LAMPS



07.02

1	Field weakening activated [1]	7	Fault lamp
2	Service interval display	8	Oil level low [1]
3	Flashing control [2]	9	Motor temperature high
4	Hand brake applied	10	Forward direction (single-pedal)
5	Motor temperature warning lamp	11	Oil temperature high[1]
6	Indicator for brake lining wear [1]	12	Reverse direction (single-pedal)

[1] Not used
[2] Optional equipment

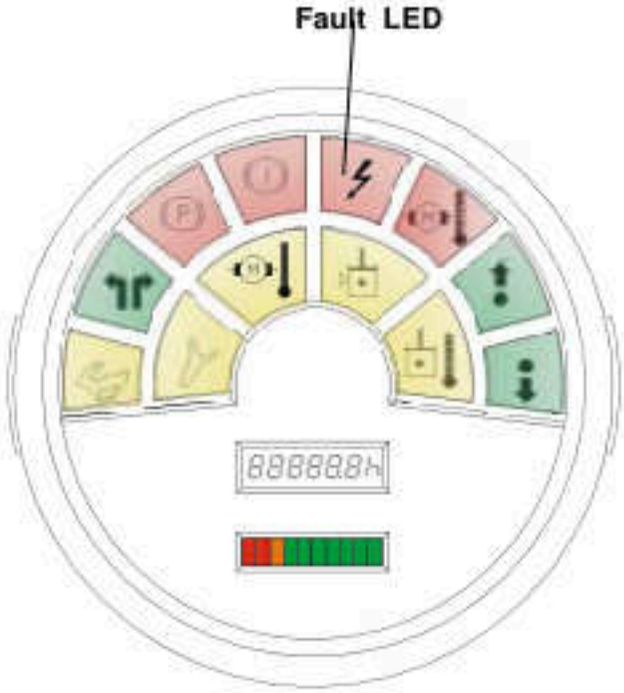
MidWestTech | Linde E 25, E30 S with AC motors Series 336 -03 Electric Forklift Servic... Order the manual at mid-west-tech.com >

DIAGNOSIS OF THE COMBINATION INSTRUMENT WITH THE TRUCK DOCTOR DIAGNOSTIC SOFTWARE

The procedure for programming and reading the data stored in the combination instrument with the help of the Truck Doctor diagnostic software is described in the documentation for the Truck Doctor software. In addition, the installation disk contains a PDF file with the complete operating instructions for the software.

ACTIVATION OF THE FAULT LED

The fault LED in the combination instrument is activated by the controller in the event of a fault. The red LED flashes on occurrence of the following faults in the traction drive:



07.02

54 Power unit 1A1 - Signal from current sensors outside permitted range

55 Power unit 1A1 - Incorrect signal from speed sensor 1B1

59 Power unit 1A1 - Overtemperature in power unit > 90 °C

61 Power unit 1A1 - Signals critical fault

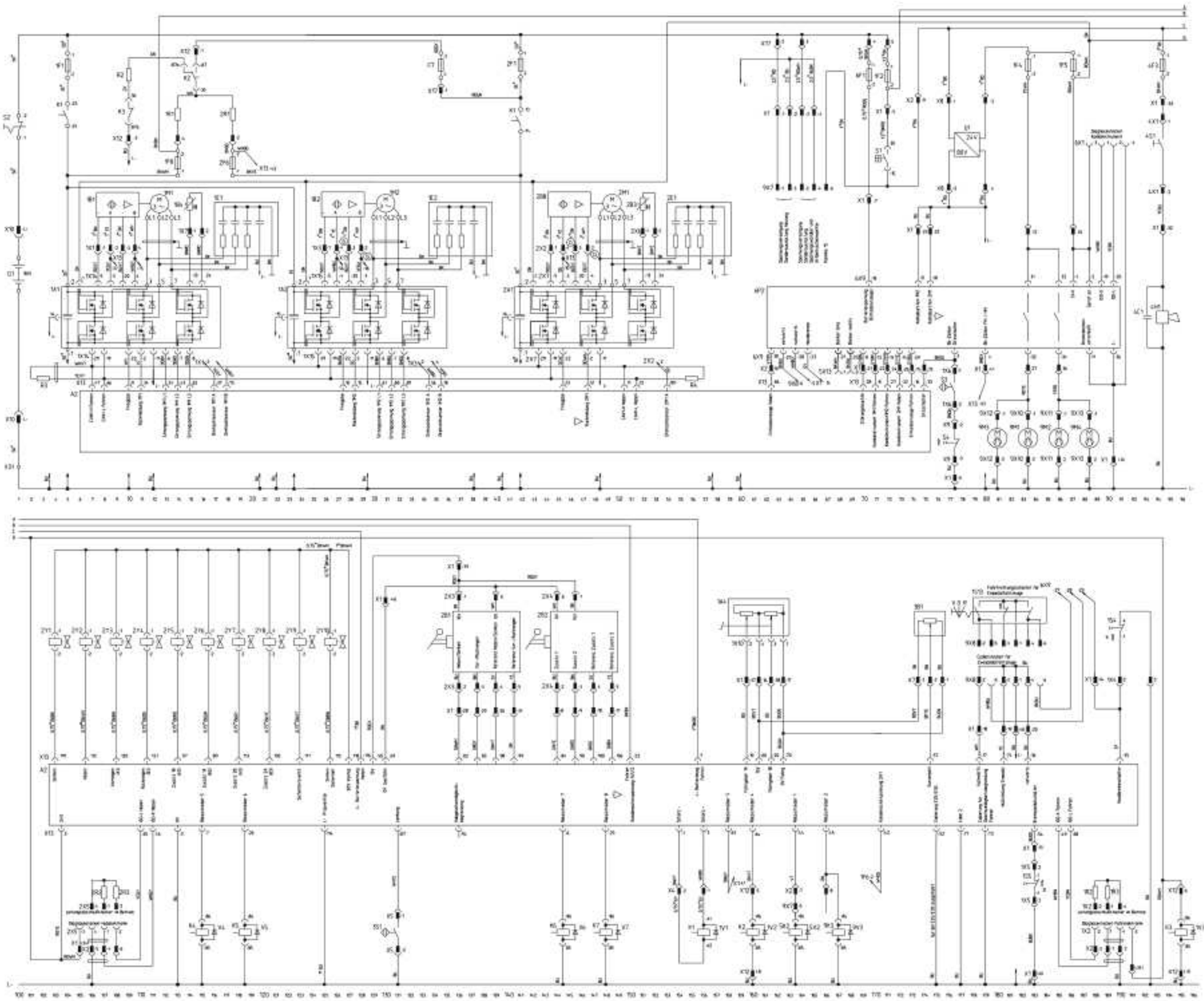
63 Power unit 1A1 - Internal 15 V supply outside permitted range

64 Power unit 1A1 - External 15 V supply outside permitted range

66 Power unit 1A1 - Fails to signal its presence through the CANbus

74 Power unit 1A2 - Signal from current sensors outside permitted range

MidWestTech | Linde E 25, E30 S with AC motors Series 336 -03 Electric Forklift Servic... Order the manual at mid-west-tech.com >



MidWestTech | Linde E 25, E30 S with AC motors Series 336 -03 Electric Forklift Service Manual | Publication 36-804-2410

Order the manual at mid-west-tech.com >